

In re Patent Application of:

ARENA ET AL.

Serial No. 09/929,833

Filed: **AUGUST 14, 2001**

In the Claims:

20. (Previously presented) A system for the analysis of an image of a DNA microarray comprising an array of spots, the system comprising:

a sensor for acquiring signals corresponding to the image of the DNA microarray, and

a cellular neural network (CNN) circuit to process the signals from said sensor.

21. (Previously presented) A system according to Claim 20 wherein said CNN circuit processes the signals by parallel processing.

22. (Previously presented) A system according to Claim 20 wherein said signals comprise analog signals, and wherein said CNN circuit processes the analog signals.

23. (Previously presented) A system according to Claim 20 wherein said sensor acquires signals corresponding to a fluorescence image of the DNA microarray.

24. (Previously presented) A system according to Claim 20 wherein said CNN circuit comprises at least one array of cells and synaptic connections interconnecting the cells.

25. (Previously presented) A system according to Claim 24 wherein said at least one array of cells has a

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spatial distribution correlated to the image of the DNA microarray.

26. (Previously presented) A system according to Claim 20 wherein said sensor comprises a matrix optical sensor.

27. (Previously presented) A system according to Claim 20 wherein said sensor comprises a matrix color optical sensor.

28. (Previously presented) A system according to Claim 20 wherein said sensor comprises an optical sensor selectively responsive to chromatic components of the image of the DNA microarray.

29. (Previously presented) A system according to Claim 28 wherein said sensor is responsive to a predetermined set of chromatic components of the image of the DNA microarray.

30. (Previously presented) A system according to Claim 29 wherein the predetermined set excludes blue chromatic components.

31. (Previously presented) A system according to Claim 30 wherein said CNN circuit processes in parallel a plurality of signals corresponding to chromatic components of the image of the DNA microarray.

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32. (Previously presented) A system according to Claim 20 wherein said sensor and said CNN circuit are integrated in a single chip.

33. (Previously presented) A system according to Claim 20 wherein at least one of said sensor and said CNN circuit comprises a CMOS device.

34. (Previously presented) A system according to Claim 20 wherein said CNN circuit performs at least one of background clearing of the image, grid analysis of the image, elimination of smaller irregular spots associated with the image, elimination of larger spots associated with the image, intensity analysis, and threshold definition.

35. (Previously presented) A system according to Claim 20 wherein said CNN circuit combines different processing results associated with distinct chromatic components of the image of the DNA microarray.

36. (Previously presented) A system according to Claim 20 wherein said CNN circuit performs a combination operation associated with different chromatic components of the image of the DNA microarray.

37. (Previously presented) A system according to Claim 36 wherein said combination operation comprises an AND logic operation.

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38. (Previously presented) A system according to Claim 20 wherein said CNN circuit comprises a memory for storing signals corresponding to the image of the DNA microarray and control logic for processing in real-time signals associated with the image in real-time.

39. (Previously presented) A system according to Claim 38 wherein said memory stores CNN parameters.

40. (Previously presented) A system according to Claim 39 wherein the CNN parameters are stored in digital form, wherein said CNN circuit further comprises a digital/analog converter, and wherein said digital/analog converter converts the CNN parameters from digital to analog form.

41. (Previously presented) A system according to Claim 20 wherein said CNN circuit processes signals corresponding to the image of the DNA microarray by applying parameters associated with a cellular neural network.

42. (Previously presented) A system for the analysis of an image of a DNA microarray, the system comprising:

a sensor for acquiring analog signals corresponding to the image of the DNA microarray, and

a cellular neural network (CNN) circuit for parallel processing the analog signals from said sensor.

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43. (Previously presented) A system according to Claim 42 wherein said sensor acquires analog signals corresponding to a florescence image of the DNA microarray.

44. (Previously presented) A system according to Claim 42 wherein said CNN circuit comprises at least one array of cells and synaptic connections interconnecting the cells, and wherein said at least one array of cells has a spatial distribution correlated to the image of the DNA microarray.

45. (Previously presented) A system according to Claim 42 wherein said sensor is an optical sensor responsive to a predetermined set of chromatic components of the image of the DNA microarray, and wherein said CNN circuit processes signals corresponding to the image of the DNA microarray by at least one of applying parameters associated with a cellular neural network and combining different processing results associated with chromatic components of the image of the DNA microarray.

46. (Previously presented) A method for analyzing an image of a DNA microarray, the method comprising:

acquiring at least one signal corresponding to the image of the DNA microarray, and

processing the at least one signal using a cellular neural network (CNN).

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47. (Previously presented) A method according to Claim 46 wherein the at least one signal comprises a plurality of signals, and wherein processing comprises processing the plurality of signals in parallel.

48. (Previously presented) A method according to Claim 46 wherein the image comprises a fluorescence image, and wherein processing the at least one signal comprises processing the plurality of signals associated with the fluorescence image.

49. (Previously presented) A method according to Claim 46 wherein processing comprises selectively processing a predetermined set of chromatic components of the image.

50. (New) A system for the analysis of an image of a DNA microarray comprising an array of spots, the system comprising:

a sensor for acquiring signals corresponding to the image of the DNA microarray; and

a cellular neural network (CNN) circuit to process the signals from said sensor, said CNN circuit combining different processing results associated with distinct chromatic components of the image of the DNA microarray.

51. (New) A system according to Claim 50 wherein said CNN circuit processes the signals by parallel processing.

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52. (New) A system according to Claim 50 wherein said signals comprise analog signals, and wherein said CNN circuit processes the analog signals.

53. (New) A system according to Claim 50 wherein said sensor acquires signals corresponding to a fluorescence image of the DNA microarray.

54. (New) A system according to Claim 50 wherein said CNN circuit comprises at least one array of cells and synaptic connections interconnecting the cells.

55. (New) A system according to Claim 54 wherein said at least one array of cells has a spatial distribution correlated to the image of the DNA microarray.

56. (New) A system according to Claim 50 wherein said sensor and said CNN circuit are integrated in a single chip.

57. (New) A system according to Claim 50 wherein said CNN circuit comprises a memory for storing signals corresponding to the image of the DNA microarray and control logic for processing in real-time signals associated with the image in real-time.

58. (New) A system for the analysis of an image of a DNA microarray comprising an array of spots, the system comprising:

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a sensor for acquiring signals corresponding to the image of the DNA microarray; and

a cellular neural network (CNN) circuit to process the signals from said sensor, said CNN circuit performing a combination operation associated with different chromatic components of the image of the DNA microarray.

59. (New) A system according to Claim 58 wherein said CNN circuit processes the signals by parallel processing.

60. (New) A system according to Claim 58 wherein said signals comprise analog signals, and wherein said CNN circuit processes the analog signals.

61. (New) A system according to Claim 58 wherein said sensor acquires signals corresponding to a fluorescence image of the DNA microarray.

62. (New) A system according to Claim 58 wherein said CNN circuit comprises at least one array of cells and synaptic connections interconnecting the cells.

63. (New) A system according to Claim 62 wherein said at least one array of cells has a spatial distribution correlated to the image of the DNA microarray.

64. (New) A system according to Claim 58 wherein said sensor and said CNN circuit are integrated in a single chip.

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65. . (New) A system according to Claim 58 wherein said CNN circuit comprises a memory for storing signals corresponding to the image of the DNA microarray and control logic for processing in real-time signals associated with the image in real-time.